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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,382	06/05/2001	Jin-Ho Lee	030681-305	4610

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EXAMINER

TAMAI, KARL I

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/873,382

Applicant(s)

LEE ET AL.

Examiner

Tamai IE Karl

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-10 and 20-23 is/are rejected.
- 7) ☒ Claim(s) 5 and 24-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0403.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

1. The amended title --MICRO-ACTUATOR WITH INTERDIGITATED COMBS PERPENDICULAR TO A BASE—has been entered into the file wrapper. The requirement of a new title is withdrawn.

Information Disclosure Statement

2. The examiner notes the United States Patents listed in the specification have been submitted on an IDS dated 4/3/03. These references have been considered by the examiner as indicated by the initialed USPTO 1449. The Korean references cited in the specification have not been provided by the applicant, therefore only the brief, written disclosure in the background of the invention of the present application has been considered by the examiner.

Drawings

3. Photographs, including photocopies of photographs, are not ordinarily permitted in utility and design patent applications. (See 37 CFR 1.84). The Applicant is required to replace the photographs with a drawing.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 8, 9, and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Victor (JP 2000418429) and Ahn et al. (Ahn)(US 6116863) and Neukermans et al. (Neukermans)(US 5629790). Victor teaches an electrostatic microactuator with a base plate with a prearranged pattern of signal lines for fixed comb shaped electrodes. The fixed combs driving movable comb electrodes on a stage supported by torsion bars for see-saw motion. Victor shows in figure 15 that the electrodes extend to the bottom of the first frame. Victor does not teach an eutectic bonding layer between the upper and lower frames or the thickness of the torsion bar is less than the driving combs. Ahn teaches that eutectic bonding is one of several bonding methods for securing frames/substrates in a MEMS device. Neukermans teaches the torsion bar has a thickness less than the stage. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the actuator of Victor with the frames secured by an eutectic bond because Ahn teaches it is the preferred mode to bond MEM frames, and it is within the ordinary skill in the art to choose between known equivalents means of bonding, and with the torsion bar being less thick than the electrodes to allow for a variety of vibrations modes, as taught by Neukermans.

6. Claims 6, 7, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Victor (JP 2000-418429) and Ahn et al. (Ahn)(US 6,116,863) and Neukermans et al. (Neukermans)(US 5629790), in further view of Nakagawa (JP 5-76186)). Victor, Ahn, and Neukermans teach every aspect of the invention except the electrodes

extending above the second frame. Nakagawa teaches the electrodes interdigital and coplanar with the stage. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the actuator of Victor and Ahn with the fixed electrodes above the second frame to be coplanar with the stage/moving electrodes to generate a good electrostatic driving force.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Victor (JP 2000418429) and Ahn et al. (Ahn)(US 6116863) and Neukermans et al. (Neukermans)(US 5629790), in further view of Nishiguchi (US 5,064,782). Victor, Ahn, and Neukermans teach every aspect of the invention except the multiplayer eutectic bond with the middle layer being Au/Sn. Nishiguchi teaches the multiplayer eutectic bond with the middle layer being Au/Sn to improve the eutectic adhesion between the frames. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the actuator of Victor and Ahn and Neukermans with the multiplayer eutectic bond with the middle layer being Au/Sn to improve the eutectic adhesion between the frames.

Allowable Subject Matter

8. Claims 5 and 24-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

9. Applicant's arguments filed 4/3/03 have been fully considered but they are not persuasive. The Applicant's arguments regarding the photocopies is not persuasive. 37 CFR 1.84(b)(1) states that photographs are accepted when they are the ONLY practical medium for illustrating the invention. The examiner believes that drawings can be provided to show the invention as shown in the photographs, therefore the photographs are not the ONLY practical medium for showing the invention. 37 CFR 1.84(b)(1) also requires the photographs must be of sufficient quality to show the details from the photographs. The photographs are not of sufficient quality to show the details because the pre-grant publication shows the details are not visible from the reproduced photographs.

The Applicant's arguments regarding the slots of the Victor is not persuasive because the claim limitation "comprising" allows the inclusion of the slots and ribs of Victor. The Applicant's argument regarding front end of the driving (moving electrodes) being on the same plane as the first frame (for claims 8 and 20-23) is not persuasive. The Applicant argues that the front end of the electrodes is the bottom of the slot, but the examiner reads the front end of the electrodes at the top of the slot which is on the same plane as the frame as shown in figure 15.

The Applicant's arguments that the electrodes of cannot be incorporated into Victor is not persuasive because the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or

all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In the instant application, the claim requires the bottom of the stage to have electrodes where the fixed electrodes extending above the moving electrodes, which is shown in Nakagawa where the fixed electrodes extend above the bottom surface of the moving stage (figure 1) to provide good electrostatic driving displacement. Therefore the combined teachings of Victor and Nakagawa provide an electrostatic actuator with good displacement. The Applicant's arguments are also not persuasive because fixed electrodes of Victor extend in between the moving electrodes, which means Victor either teaches or suggests the fixed electrodes are higher than the second frame because the lower surface of the frame is the same as the lower surface of the electrodes. The Applicant's argument that Nakagawa teaches electrodes that extend parallel is not persuasive because the direction in which the electrodes extend is not claimed, only that the electrodes are formed on the bottom of the stage, which Nakagawa meets because the parallel electrodes are included in the bottom surface.

The Applicant's argument regarding front end of the driving(moving electrodes) being on the same plane as the first frame is not persuasive. The Applicant argues that the front end of the electrodes is the bottom of the slot, but the examiner reads the front end of the electrodes at the top of the slot which is on the same plane as the frame as shown in figure 15. The Applicant's argument that claim 10 is allowable because of the

previous arguments is not persuasive because the other arguments were not persuasive.

Conclusion

10. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl I.E. Tamai whose telephone number is (703) 305-7066. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist at (703) 308-0956.

Karl I Tamai
PRIMARY PATENT EXAMINER
June 23, 2003

KARL TAMAI
PRIMARY EXAMINER

